

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P 16465WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 03/02704	International filing date (day/month/year) 14.03.2003	Priority date (day/month/year) 27.03.2002
International Patent Classification (IPC) or both national classification and IPC H04L12/24		
Applicant LIGHTMAZE AG		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I  Basis of the opinion
- II  Priority
- III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV  Lack of unity of invention
- V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI  Certain documents cited
- VII  Certain defects in the international application
- VIII  Certain observations on the international application

Date of submission of the demand 27.10.2003	Date of completion of this report 11.06.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Alonso Martin, M.E. Telephone No. +31 70 340-1992



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PCT/EP 03/02704

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-19 as originally filed

**Claims, Numbers**

2-14, 16-25 as originally filed  
1, 15 received on 15.05.2004 with letter of 14.05.2004

**Drawings, Sheets**

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).  
*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*
6. Additional observations, if necessary:

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees, the applicant has:
  - restricted the claims.
  - paid additional fees.
  - paid additional fees under protest.
  - neither restricted nor paid additional fees.
2.  This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:
  - complied with.
  - not complied with for the following reasons:
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:
  - all parts.
  - the parts relating to claims Nos. 1-5, 9-25 .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	3,9,13,16-25
	No: Claims	1,2,4,5,10-12,14,15
Inventive step (IS)	Yes: Claims	16,17,19,23-25
	No: Claims	3,9,13,18,20-22
Industrial applicability (IA)	Yes: Claims	1-5,9-25
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Re Item IV**

**Lack of unity of invention**

1. Claims: 1-5, 9-25

2. Claims: 1,6-8

The present application addresses two different problems.

The first problem deals with the high price of networks which provide protection and self healing against multiple types of failures, as well as the dependency of these networks on some specific protocols and architectures (see description page 2, line 30 - page 3, line 5).

The second problem deals with the need of providing a network element with management functions with switch terminals between optical transmitters and optical receivers (see description page 7, lines 17-18).

The first problem is solved by a first group of claims (1-5, 9-25), which deal with an optical network element for use in a node of an optical network, comprising a local network management system with means for building a self healing supervisory connection between two nodes of the optical network, and which comprises a node manager with several software agents to carry out different managing functions in the network.

The second problem is solved by a second group of claims (1, 6-8), which deal with an optical network element which comprises a back-plane with electrical transmission lines and electrical terminals, and attached to the back-plane plugged-in line-card slices comprising switchable optical receivers, optical transmitters and optical converters, and a supervisory card.

The only feature common to both sets of claims is represented by the subject-matter of claim 1, which defines an optical network element comprising a local network management system able to build a supervisory connection.

However, the prior-art document "A Network and Services Integrated Management System Prototype" by Albanese, Devetzis and Maszczak, cited in the international search report,

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reveals that the subject-matter of claim 1 is not new, and therefore that the above-mentioned common features are not "special technical features" for the purpose of Rule 13.2 PCT.

As a matter of fact the document discloses an optical network element for use in a node of an optical network including a plurality of nodes which are interconnected so as to be capable of carrying traffic between selected nodes, comprising a local network management system (see page 72, chapter 3.4, "Network Administrator (NA)") including means for building up a supervisory connection (see page 72, chapter 3.4, "management connection") between the network element and at least a network element of a further node of the optical network. The additional feature according to which the local network management system supports an arbitrary network topology is an implicit feature, as the network topology is transparent to the management layer in any management network and therefore cannot be considered as a special technical feature for the purpose of Rule 13.2 PCT.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: ALBANESE A ET AL: 'A network and services integrated management system prototype' COMPEURO '91. ADVANCED COMPUTER TECHNOLOGY, RELIABLE SYSTEMS AND APPLICATIONS. 5TH ANNUAL EUROPEAN COMPUTER CONFERENCE. PROCEEDINGS. BOLOGNA, ITALY 13-16 MAY 1991, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 13 May 1991 (1991-05-13), pages 68-73, XP010022920 ISBN: 0-8186-2141-9
- D2: SLOBODANKA TOMIC: 'MANAGEMENT INFORMATION MODEL FOR OPTICAL WDM NETWORKS' INTEROPERABLE COMMUNICATIONS NETWORK, BALTZER SCIENCE PUBLISHERS, BUSSUM,, NL, vol. 2, no. 1, 1999, pages 147-160, XP001011288 ISSN: 1385-9501
- D3: EP-A-1 152 631 (NORTEL NETWORKS LTD) 7 November 2001 (2001-11-07)
- D4: SUMMERFIELD M A: 'Wavelength division multiplexing for local area networks'

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LASERS AND ELECTRO-OPTICS, 1999. CLEO/PACIFIC RIM '99. THE PACIFIC RIM CONFERENCE ON SEOUL, SOUTH KOREA 30 AUG.-3 SEPT. 1999, PISCATAWAY, NJ, USA, IEEE, US, 30 August 1999 (1999-08-30), pages 1215-1216, XP010364322 ISBN: 0-7803-5661-6

1. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 2, 4, 5, 10, 11, 12, 14 and 15 is not new in the sense of Article 33(2) PCT.

1.1 The document **D3** discloses (the references in parentheses applying to this document) an optical network element for use in a node of an optical network including a plurality of nodes which are interconnected so as to be capable of carrying traffic between selected nodes, comprising a local network management system including means for building up a supervisory connection (paragraph 1) between the network element and at least a network element of a further node of the optical network, wherein the supervisory connection is a redundant connection through two or more paths and the local network management system provides monitoring the status of all paths of the redundant supervisory connection, and in the event of an impairment of a specific supervisory connection establishing an alternative route for the respective supervisory connection (paragraph 38).

The additional feature according to which the local network management system supports an arbitrary network topology is an implicit feature, as the network topology is transparent to the management layer in any management network.

The same reasoning applies to the method claim 15.

1.2 Dependent claim 2 does not contain any features which, in combination with the features of claim 1, meet the requirements of the PCT in respect of novelty, see D3 (paragraph 34).

1.3 Dependent claim 4 does not contain any features which, in combination with the features of claim 1, meet the requirements of the PCT in respect of novelty, see D3 (paragraph 35).

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- 1.4 Dependent claim 5 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of novelty, see document D3 (paragraph 34).
- 1.5 Dependent claim 10 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of novelty, see document D3 (paragraph 26).
- 1.6 Dependent claim 11 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of novelty, see document D3 (paragraph 24).
- 1.7 Dependent claim 12 does not contain any features which, in combination with the features of claim 11, meet the requirements of the PCT in respect of novelty or inventive step because the establishment of a direct logical supervisory connection by a network management system is trivial, as said management system belongs to a logical layer.
- 1.8 Dependent claim 14 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of novelty, see document D3 (paragraph 38).
2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 3, 9, 13, 18, 20, 21 and 22 does not involve an inventive step in the sense of Article 33(3) PCT.
  - 2.1 Dependent claim 3 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step, see document D3 in combination with document D1, page 72, chapter 3.5.
  - 2.2 Dependent claim 9 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step, see document D3 in combination with document D2, page 151, chapter 2.4: "in-band OH channel".

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- 2.3 Dependent claim 13 does not contain any features which, in combination with the features of claim 12, meet the requirements of the PCT in respect of inventive step, see document D3 in combination with document D4.
- 2.3 Dependent claim 18 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step, see document D3 in combination with document D1, chapter 3.4: "switch the management connection".
- 2.4 Dependent claim 20 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step, see document D3 in combination with document D1, chapter 3.4: "Network Administrator".
- 2.5 Dependent claim 21 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step, see document D3 in combination with document D1, chapter 3.5.
- 2.6 Dependent claim 22 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step, see document D3 in combination with document D1, chapter 3.5.
3. The combination of the features of dependent claims 16, 17, 19, 23, 24 and 25 is neither known from, nor rendered obvious by, the available prior art.

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## PATENT CLAIMS

5 1. Optical network element for use in a node of an optical network including a plurality of nodes which are interconnected so as to be capable of carrying traffic between selected nodes, comprising of

10 1.1 a local network management system (11) including means for building up a supervisory connection (10.1) between the network element and at least a network element of a further node of the optical network; characterized in that

15 1.2 the local network management system (11) is installed to support an arbitrary network topology and to build up a supervisory connection (10.1) to at least one predetermined other node of the network so as the network element could be integrated in an optical network with arbitrary topology, whereby

20 1.3 the supervisory connection (10.1) is a redundant connection through two or more paths;

1.4 the local network management system (11) provides monitoring the status of all paths of the redundant supervisory connection (10.1), and in the event of an impairment of a specific supervisory connection establishing an alternative route for the respective supervisory connection.

15. A method of providing a supervisory network in an optical network with an arbitrary topology including a plurality of nodes which are interconnected so as to be capable of carrying traffic between selected nodes, comprising the steps of:
  - 15.1 automatic discovery of the network topology;
  - 15.2 establishing of redundant supervisory connections (10.1) between predetermined nodes of the network;
  - 10 15.3 monitoring the status of all paths of the redundant supervisory connection (10.1);
  - 15.4 in the event of an impairment of a specific supervisory connection establishing an alternative route for the respective supervisory connection.

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